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**United States Patent** [19]

Marshall et al.

[11] **Patent Number:** **5,594,468**[45] **Date of Patent:** **Jan. 14, 1997**[54] **OPTICAL SYSTEM AUXILIARY INPUT CALIBRATION ARRANGEMENT AND METHOD OF USING SAME**[75] Inventors: **Roger N. Marshall**, Solana Beach; **Richard M. Lizon**, Escondido; **Jeffrey W. Busch**, Sante; **Lane T. Hauck**, San Diego, all of Calif.[73] Assignee: **Proxima Corporation**, San Diego, Calif.[21] Appl. No.: **342,814**[22] Filed: **Nov. 21, 1994****Related U.S. Application Data**

[63] Continuation of Ser. No. 276,773, Jul. 18, 1994, abandoned, which is a continuation of Ser. No. 829,880, Feb. 3, 1992, abandoned, which is a continuation-in-part of Ser. No. 656,803, Feb. 14, 1991, abandoned, and a continuation-in-part of Ser. No. 611,416, Nov. 9, 1990, Pat. No. 5,181,015, which is a continuation-in-part of Ser. No. 433,029, Nov. 7, 1989, abandoned.

[51] **Int. Cl.<sup>6</sup>** ..... **G09G 5/08**[52] **U.S. Cl.** ..... **345/158; 345/87; 345/156; 348/744**[58] **Field of Search** ..... 345/7, 8, 9, 157, 345/156, 158, 183, 182, 180, 87; 348/211, 221, 229, 744, 745, 746, 747; 359/142, 443, 448, 449; 434/323, 324, 325, 337[56] **References Cited****U.S. PATENT DOCUMENTS**

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*Primary Examiner*—Richard Hjerpe*Assistant Examiner*—Xiao M. Wu*Attorney, Agent, or Firm*—Bernard L. Kleinke[57] **ABSTRACT**

A method and optical system auxiliary input calibration arrangement accurately and reliably discriminate between a user generated image and a video source generated image, such as one produced by a computer. The calibration arrangement includes amplifier devices for increasing the strength of a video information signal indicative of the video generated image, and a user generated auxiliary input signal indicative of an auxiliary input light image, without increasing spurious ambient light signals. A discrimination circuit generates a detection signal whenever the amplified information signals are greater than a predetermined reference level signal. A microprocessor calculates the appropriate predetermined reference level signal based upon ambient lighting conditions, the strength of that portion of the information signal indicative of the video image, the type of optical system and the distance the optical system is disposed away from a viewing surface. The microprocessor controls the exposure time of the light sensing device and selects an appropriate level of amplification for the output signal from the sensing device to increase light sensitivity between the video source generated light images as compared to the user generated auxiliary light images. A dual beam light generating device produces a low intensity laser beam for helping a user locate a desired portion of the video generated image and a high intensity laser beam for providing auxiliary input light of the desired position of the image illuminated by the low intensity beam.

**39 Claims, 26 Drawing Sheets**